

FIELD OF ACTIVITY



Laboratory standard lamp



Laboratory of Refractometry



Laboratory for Speedmeters

In the fields of Photometry and Radiometry, the Laboratory is responsible for the development of national metrology standards and has the following incumbencies: the maintenance of the national standard of the Luminous Intensity, calibrations, participation and coordination of inter-laboratories comparisons and support for Legal Metrology.

In the field of Refractometry, the Laboratory is responsible for the development of national metrology standards and has the following incumbencies: calibrations of refractometers for liquids, certifications of standard solutions for refractometers and tests of the Metrological Control of refractometers for grape musts.

In the field of Radiofrequencies, the Laboratory performs tests of Metrological Control of speedmeters that are used for the road traffic law enforcement.

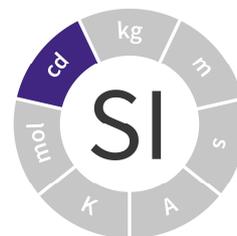
SI UNITS

International System (SI) Base Unit of Luminous Intensity (I_v):

candela (cd) defined as:

The candela, symbol **cd**, is the SI unit of luminous intensity in a given direction.

It is defined by taking the fixed numerical value of the luminous efficacy of monochromatic radiation of frequency 540×10^{12} Hz, K_{cd} , to be 683 when expressed in the unit lm W^{-1} , which is equal to cd sr W^{-1} , or $\text{cd sr kg}^{-1} \text{m}^{-2} \text{s}^3$, where the kilogram, metre and second are defined in terms of h , c and $\Delta\nu_{Cs}$.



SI derived unit of the quantity Illuminance (E_v):

lux (lx or lm/m^2) defined as:

The illuminance of a 1 lumen luminous flux in a 1 square meter surface.

Dimensionless Derived Quantity Refractive Index (n):

(of a medium, for a monochromatic radiation) defined as:

The ratio of the speed of the electromagnetic waves in vacuum to the phase speed in a given direction of the waves of the monochromatic radiation in the medium.

TRACEABILITY

In the fields of Photometry and Spectrophotometry, respectively, a photometric bench with standard lamps and a standard photometer on the one hand and high performance spectrophotometers with standard filters and tiles, on the other hand, obtain the traceability from other NMI national standards.

In the field of Refractometry, the measurements traceability is obtained to certified reference materials.

In the field of Radiofrequencies, the traceability for the quantities time and length is obtained from the LNM national standards of the second and the metre, respectively.



Calibration

MEASURING INSTRUMENT	MEASURING INTERVAL	EXPANDED UNCERTAINTY ($k=2$)	CMC
Lamps	[50; 1 000] cd	1,6 %	
Illuminance meters	[5; 1 000] lx	1,6 %	
Photometers	reading/lx; V/lx	1,6 %	
Spectrophotometers for Regular Transmission	[1,0; 90,0] %	0,3 %	
Spectrophotometers for Regular Reflection	[1,0; 90,0] %	0,3 %	
Refractometers for liquids	$1,320\ 00 \leq n \leq 1,580\ 00$	0,000 02	
	$0,00\ \text{cg/g} \leq X_m \leq 85,00\ \text{cg/g}$	0,02 cg/g	
	$0,00\ \text{cL/L} \leq X_{V,\text{pot}} \leq 55,00\ \text{cL/L}$	0,01 cL/L	

Preparation or Certification of Reference Materials

REFERENCE MATERIAL	MEASURING INTERVAL	EXPANDED UNCERTAINTY ($k=2$)	CMC
Filters for regular transmittance	[380; 780] nm	0,2 nm	
Tiles for regular reflectance	[380; 780] nm	0,2 nm	
Filters for regular transmittance	[1,0; 90,0] %	0,3 %	
Tiles for regular reflectance	[1,0; 90,0] %	0,3 %	
Standard solutions for refractive index	$1,332\ 98 \leq n \leq 1,580\ 00$	0,000 02	
Standard aqueous solutions for sucrose mass fraction	$0,00\ \text{cg/g} \leq X_m \leq 85,00\ \text{cg/g}$	0,02 cg/g	
Standard aqueous solutions for potential alcohol volume fraction	$0,00\ \text{cL/L} \leq X_{V,\text{pot}} \leq 55,00\ \text{cL/L}$	0,01 cL/L	

Metrological Control

MEASURING INSTRUMENT	TESTS	LEGISLATION
Speedmeters	Type Approval Initial Verification	Portaria n.º 1542 / 2007 de 6 de dezembro
Refractometers for grape musts	Periodical Verification Extraordinary Verification	Portaria n.º 1548 / 2007 de 7 de dezembro

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